Some draft thoughts on the water demand estimates and scenarios

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I'm sorry to have missed the presentation of the demand estimates at the Bulletin 160-05 meeting yesterday. I'm sure this would have clarified several of my concerns. Before I had to leave, another AC member asked me what I thought of these estimates and expressed some of his own concerns, which I understand were not unique (at least before the presentation). Hopefully, all the concerns were alleviated and this memo can be scrapped.

Alas, some background is important. A major shortcoming of Bulletin 160-98 was a lack of faith in "the numbers." The quantitative analysis in Bulletin 160-98 was a simple "gap" analysis, with no discussion or interpretation of whether the "gap" was really important (in an economic sense) overall or for particular wet or dry conditions and locations. Demands and supplies were estimated only for "average" and "drought" conditions and only in volumetric quantities, not economic values of demands. [As an academic point, modern methods and theory for economic valuation of demand originated in 1844 with the engineer Jules Dupuit for French canals.] The Bulletin 160-98 numbers also were based on assumptions that were hard to pin down and methods that are simple, but rudimentary. For CALVIN, we had to go through these numbers and methods in some detail for developing our own rudimentary estimates.

I was less troubled by the Bulletin 160-98 numbers than were some other people; these estimates, by any method, have unavoidable difficulties, which sometimes are made worse by fancier methods. However, for the demand estimates I was very concerned that a) single-valued water use quantities were used as water "requirements" for a rather uninformative "gap" analysis (rather than economic water demands), b) the data and methods were neither available nor critically discussed, even in a remote appendix or technical memo, and c) most importantly, the controversy over the numbers seemed to cast doubts and divert people from what I thought were the progressive aspects of the Bulletin 160-98 plan.

Since Bulletin 160-98, controversies over CALSIM II have further raised concerns for "the numbers" in general. Some of these controversies are real technical ones, and sometimes they are interest-driven (or at least interest-amplified). We who are enamored of computation and developing and using quantitative understandings of systems are in a precarious position. We all suffer now from a very unfortunate legacy, made worse by water's political context, rising expectations for technical quality control, commonly unrealistic expectations for modeling accuracy and consensus, and (frankly) unenlightened work on some occasions.

This situation seems precarious enough that it is easy to do more harm than good with numbers in Bulletin 160-05. This is a painful thought, since California water planning cannot really advance far without a good deal more (and better) numbers than we have

seen historically. Quantitatively, there is little doubt in my mind that Bulletin 160-05 is (perhaps unavoidably) a large step backwards from a pretty miserable beginning.

I apologize for the long preamble. Here are some things I like about the demand analysis:

a) The method is better written-up than the method used for Bulletin 160-98.
b) The numbers represent a range of scenarios that can indicate the degree of uncertainty in future water use.
c) Numbers are often good for stimulating more precise inquiry and discussion.

My concerns for the demand analysis (as I understand it):

1) The calculations seem a well-intended, but warmed-over version of the Bulletin 160-98 approach to demand estimation, only they are run for a range of scenarios.
2) Modern demand estimation methods were not used. The long-promised IWR-MAIN and CALAG methods seem to have evaporated. What ever became of these? These are more modern and more flexible approaches.
3) Demand estimates still lack an economic dimension – so they are still essentially interpretable as water "requirements" for a "gap" analysis. Editorially, the term "water demand" should be replaced by "water use" throughout.
4) Are these estimates "consumptive" or "applied" water uses? This is fundamental.
5) Given the scrutiny that any post-Bulletin 160-98 demand estimates will attract from avid water conservationists and others, no serious effort was made to bring broader water demand expertise (particularly from outside DWR) to bear on improving the method or justifying or testing the method and/or results.
6) In this environment, the documentation is insufficient. No self-critical write-up or discussion on how to improve is provided.
7) Despite disclaimers, ANY estimate appearing in the California Water Plan Update is an official estimate. No matter how tentatively expressed or heavily caveated, these will be the official water demand estimates for the next 5 years, even if they were random numbers.
8) Given the precarious situation of quantitative analysis for Bulletin 160, little responsive improvement is made in the demand estimation. In the current environment, these numbers are likely to be more suspect and controversial than those of Bulletin 160-98. Technically, they might be a little better, but perceptually, they are likely to be seen as worse. This is not what we in the water community need. I worry that continued controversy over water demand numbers will discredit future quantification and analysis efforts by anyone (DWR, RAND, or even UC Davis).

With one month to go until the release of the public review draft, this seems to be a mess. The original intent of the 3-phase approach was to let Phase 1 produce a policy discussion piece (no numbers). However, to follow up with reasonable numbers in Phase 2 required an immediate effort (a year or so ago) to develop a broadly-supported approach to developing at least some numbers. This was never done. My impression is that about 7 months ago it was decided that demand numbers were needed (perhaps for

legal reasons), and so now we have water use estimates from a warmed-over method without a broad technical base of support.

The options now are not promising. Here are some option ideas:

1) Use the demand estimation numbers only to illustrate uncertainty and the need for better numbers, with better methods and a process to build broad technical support for the methods, numbers, and interpretation of the numbers. Ideally, this would include a substantive DWR commitment (not just another promise) to develop a better technical approach and support.
2) Cut the numbers entirely, call Bulletin 160-05 a conceptual policy plan, and begin the process that should have begun over a year ago to build more broadly supportable numbers and use of numbers. (This might not be an option legally or politically.)
3) If the numbers are required for legal or other reasons, put these numbers in a remote volume of the plan – this would also provide more space to discuss them more broadly. We don't want this to distract from the good policy directions which the Phase I product was designed to provide.
4) Should demand estimates appear, an effort should be made to identify how they are better than those for Bulletin 160-98 and how they might be improved, with a substantive DWR commitment. This might dampen some criticisms.
5) Continue as is and see what happens.

Looking forward, water demand estimates are a good place to start reducing controversy regarding "DWR's" numbers and providing broadly-supported products useful to local and regional water planning agencies – which fits well with the plan's emphasis on local and regional planning with technical support from the State.

To generate methods and estimates with a broad base of technical support, DWR might need to ask a panel of internal and external water demand technical experts to develop and evaluate a range of methods for a range of DWR budgetary conditions. The AC and DWR staff might establish some desirable attributes of these methods, so the panel could see what the ideal method would ideally produce. The panel might need to meet several times for discussions, rather than an intense single session, with a workshop or so, to allow broader input and hopefully buy-in from various parties. A smaller set of external water demand experts might oversee implementation of the method, and perhaps the final product and its interpretation. What more could one ask for, realistically?

David Groves and the DWR staff have fallen into an unfortunate role in all this, which is fundamentally unfair to them. The background on this issue is very difficult, and more than computation and energy is required. Had David and the DWR staff done this work for Bulletin 160-98, it would have been a worthy advance.

I apologize for the pessimistic tone and for rambling on so. Hopefully the presentations adequately addressed these concerns and those of others and we will rest easy when we read the public review draft.